

OLPPP/HESIS Medical Guidelines

OCCUPATIONAL LEAD POISONING PREVENTION PROGRAM (OLPPP) HAZARD EVALUATION SYSTEM & INFORMATION SERVICE (HEIS)

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The Lead-Exposed Worker

In brief...

- Two Cal/OSHA* Lead Standards--for general and construction industries-- specify requirements for protection of workers and medical surveillance.
- Thousands of workers in California are still exposed to lead at unsafe levels.
- Lead affects multiple body systems and can cause permanent damage.
- Primary treatment is reduction of or removal from exposure.
- Take-home lead exposure can poison workers' household members.
- Physicians caring for lead-exposed workers have legal responsibilities.

The "lead standards" established by Cal/OSHA -- for general industry in 1979 and the construction industry in 1993--require employers and clinicians to follow very specific guidelines for protecting lead-exposed workers. Clinicians serving as the medical supervisor for a company's lead program play a key role in the implementation of the lead standards. Clinicians who are not company medical supervisors, but are nonetheless caring for lead-exposed workers, need to be informed about the health effects of lead, employer and physician responsibilities, and worker rights. This document reviews the lead standards as they apply to the medical aspects of a workplace lead safety program and makes recommendations about medical management of the lead-exposed worker.

Lead is used in more than 100 industries in the United States. Although the toxic effects of lead have been known for centuries, lead poisoning is still widespread. Adults are primarily exposed in the workplace. Lead affects multiple body systems and can cause permanent damage. Lead poisoning, if undetected, often results in misdiagnosis and costly care. Many workers with lead toxicity do not receive medical attention and, for those who do, follow-up may not be adequate to prevent future lead poisoning.¹

The Occupational Lead Poisoning Prevention Program (OLPPP) in the California Department of Health Services maintains the Occupational Blood Lead Registry. Laboratories are required to report blood lead levels (BLLs) greater than 25 micrograms per deciliter (ug/dL). Regulations requiring laboratories to report all BLLs are pending.

In 1999, OLPPP received from laboratories 11,476 BLL reports representing 5,252 lead-exposed workers. This included 2,288 reports for 859 workers with BLLs 25 ug/dL and higher; approximately 13% of these had peak BLLs of 40 ug/dL or greater. These numbers seriously underestimate the magnitude of occupational lead poisoning since studies have shown that only a small percentage of employers in lead industries provide routine blood lead testing for lead-exposed employees.^{2,3}

Toxicology of Lead

Lead is not an essential element and serves no useful purpose in the body. Low exposures that in the past were thought safe are now considered hazardous as new information emerges about the toxicity of lead. Efforts to reduce lead in the environment have resulted in lowering the geometric mean BLL for adults in the United States from more than 12 to less than 3 ug/dL.

*California Division of Occupational Safety and Health

between 1980 and 1994.⁴ However, even though the average BLL has markedly declined, many workers in high-risk industries are still overexposed. With the elimination of organic lead from gasoline, exposures in the U.S. are now primarily due to the inorganic form of lead. Routes of exposure for inorganic lead are *inhalation* and *ingestion*. Lead fume and soluble lead dust are nearly completely (. 80%) absorbed by inhalation. In general, adults absorb about 10-15% of an ingested dose through the gastrointestinal tract, in contrast to 50% absorption for children. Gastrointestinal absorption may be influenced by particle size (inverse proportion) and solubility of lead compounds, as well as fasting and nutritional status. Once absorbed, lead is found in all tissues but eventually 90% or more of the body burden is accumulated (or redistributed) into bone. Lead does not remain in the bone permanently; rather, it is slowly released back into the blood with a half-life of years to decades. Lead is excreted primarily through the urine with smaller amounts in feces, sweat, hair and nails.

The single best diagnostic test for lead exposure is the blood lead level. While it reflects the amount of lead currently found in the blood and soft tissues (and hence key target organs), the BLL alone is not a reliable indicator of prior or current exposure, or total body burden. This is because lead in the blood reflects contributions from current external exposures, as well as from the slow release of lead accumulated in the bones over a period of years. When interpreting a person's blood lead level, three key questions to keep in mind are whether the exposure is:

- acute or chronic?
- recent or remote?
- high or low?

An indirect measure of exposure and a physiological marker for the biologically harmful effects of lead is erythrocyte protoporphyrin (EP) or zinc protoporphyrin (ZPP). An increase indicates lead is affecting the heme synthesis pathway. This effect can begin at a BLL as low as 20 ug/dL in some adults, but is not greater than 90% sensitive until the BLL exceeds 50 ug/dL. An increase in EP or ZPP usually lags an increase in BLL by 2 to 6 weeks. Therefore, a normal EP or ZPP in the presence of an elevated BLL suggests recent exposure.

Other medical conditions can cause an elevated EP or ZPP, the most common being iron deficiency anemia and inflammatory conditions.^{5,6} Generally, screening for other causes is recommended if the EP or ZPP is above 50 ug/dL and the BLL is below the threshold of heme effect.

Table 1
Symptoms Associated with Lead Toxicity

Mild Toxicity

mild fatigue or exhaustion
emotional lability, difficulty concentrating
sleep disturbances

Moderate Toxicity

headache
general fatigue or somnolence
muscular exhaustion, myalgia, arthralgia
tremor
nausea, weight loss
diffuse abdominal pain, constipation or diarrhea
decreased libido

Severe Toxicity

colic (intermittent, severe abdominal cramps)
peripheral neuropathy
encephalopathy

Periodic testing of BLL and ZPP is called *biological monitoring*. This provides valuable information to assess lead exposure for individuals as well as groups of workers. A detailed exposure history is an essential part of evaluating and interpreting biological monitoring information.

Lead adversely affects several body systems. Clinically, the most sensitive are the nervous, hematopoietic, gastrointestinal, cardiovascular, musculoskeletal, renal and reproductive systems. There is wide variation in individual susceptibility to lead poisoning. Symptoms begin in some people with a BLL of 25 ug/dL.⁷ In general, the number and severity of symptoms worsen with increasing BLL (Table 1).

Early symptoms are often subtle and nonspecific, involving the nervous system (listlessness, fatigue, irritability, sleep disturbance, headache, difficulty concentrating, decreased libido), the gastrointestinal system (abdominal cramps, anorexia, nausea, constipation, diarrhea) or the musculoskeletal system (arthralgia, myalgia). A high level of intoxication can result in delirium, seizures and coma associated with lead encephalopathy, a life-threatening situation.

Research shows multiple health effects at levels once thought safe. Several studies suggest that lead may elevate blood pressure in susceptible adults at blood lead concentrations as low as 14 ug/dL.^{8,9} A study of 590 men aged 48 to 92 years, with predominately nonoccupational lead exposure and a mean BLL

concentration of 6.3 ug/dL, found that increases in bone lead concentration were associated with an increased risk of hypertension.¹⁰ Since hypertension is a significant risk factor for heart disease, lead exposure may exert an important influence on cardiovascular mortality.

Early kidney damage is difficult to detect. However, a 10 ug/dL increase in BLL has been associated with a 10.4 ml/minute decrease in renal creatinine clearance rate.¹¹ In a population of older men with a mean BLL of 8.6 ug/dL (range 0.2-54.1), a 10-fold increase in BLL predicted an increase of 0.08 mg/dL in serum creatinine concentration, roughly equivalent to 20 years of aging.¹²

Subclinical slowing of nerve conduction velocity has been seen at BLLs as low as 30 ug/dL.¹³ Neuropsychological studies performed in workers with blood lead concentrations in the 30 to 50 plus ug/dL range have detected subtle adverse effects on reaction time, visual-motor coordination, and mood.^{14,15,16,17} Because of the blood-brain barrier, lead and other heavy metals are slow to enter and leave the brain tissue. Consequently, central nervous system effects may sometimes persist well after the BLL has dropped below the action levels required by the lead standards. These effects may negatively impact job performance and safety.

A decrease in hemoglobin is seen with BLLs above 50 ug/dL. However, bone lead levels were significantly correlated with a decrease in hemoglobin and hematocrit even though BLLs were low (mean 8.3 ug/dL); this may reflect a subclinical effect of bone lead stores on hematopoiesis.¹⁸

In males, abnormal sperm morphology and decreased sperm count have been observed at approximately 40 ug/dL.^{19,20} In females, lead readily crosses the placenta and is present in breast milk.²¹ Impaired cognitive development has been observed in children with prenatal lead exposure.²² Evidence suggests this effect is enhanced by postnatal low-level environmental exposure.²³ The persistence of this effect is still uncertain.²⁴

Household members of workers with lead exposure are at increased risk for lead poisoning if lead is carried home on the worker's body, clothes, shoes or in the personal vehicle (called "take-home" exposure). Employers may be held liable for health damage to household members caused by an improperly protected worker who takes lead home. Children under 6 years old and the fetus are especially sensitive to neurological

Table 2
Some Employer Responsibilities
Under the OSHA Lead Standards

- Monitor the air for lead
- Keep air lead levels below 50 ug/m³ using engineering or work practice controls
- Provide respirator if employee requests, or if needed for exposure control
- Provide medical monitoring for employees
- Provide protective clothing, separate eating area, and washing facility for employees
- Train employees annually on:
 - sources of lead exposure
 - hazards associated with lead
 - methods of reducing lead exposure
 - employee rights under the standards
- Maintain air monitoring and medical records
- Pay employee's full salary during medical removal
- Make copy of standard available to employees and medical supervisor
- Notify employee of BLL result within 5 days

damage. Available evidence suggests there is no BLL without risk of health effects in these populations.²⁵

The Cal/OSHA Lead Standards

The Cal/OSHA general industry lead standard (Title 8 CCR §5198) was adopted in 1979 to reduce workplace exposures and to prevent frank lead poisoning through early identification of elevated BLLs. In 1993, Cal/OSHA adopted a similar lead standard for the construction industry (Title 8 CCR §1532.1).

The lead standards are comprehensive and explain the employer's responsibilities to lead-exposed employees including medical surveillance requirements (Table 2). The medical surveillance requirements are essentially identical to the federal OSHA lead standards 29 CFR 1910.1025 for general industry and 29 CFR 1926.62 for the construction industry. Additional information for clinicians is contained in Appendix C of both standards.

The standards require employers to assess employee exposure to lead, control exposures (through use of engineering controls, choice of work method, hygiene and housekeeping procedures, and respiratory protection), train employees, and establish an ongoing medical surveillance program. Employers are required to pay for all medical monitoring and to continue to pay the salary and benefits of employees who are removed

Table 3
Some Physician Responsibilities
Under the OSHA Lead Standards

- Be familiar with the lead standards
- Be informed about the health effects of lead and appropriate medical management
- Provide required biological monitoring and medical evaluations of employees
- Determine employee fitness for work with lead
- Make written recommendations to employer for initiating and discontinuing any restrictions including Medical Removal Protection (MRP)
- Provide employer with results relating only to employee's occupational exposure to lead
- Notify employee directly of any medical conditions requiring further evaluation
- Notify employee in writing prior to any chelation as to the reason for therapy
- Collaborate with employer to identify work areas or tasks associated with high exposure
- File Doctor's First Report of Injury or Illness for MRP cases within 5 days

from work for medical reasons related to lead exposure. Employers must have a licensed physician supervise the lead medical surveillance program.

Physicians in a stated or unstated contractual arrangement with an employer should know their duties to the employer and employees under the lead standards and be cognizant of any potential legal liabilities that may arise from this relationship (Table 3). Physicians may unknowingly find themselves in this role either as a consultant to a laboratory that tests blood lead levels or as the *de facto* health care provider for a company. The lead standards should be consulted prior to implementing a medical surveillance program. Copies of the standards and a model contract for a lead medical program for employers and physicians are available from OLPPP.

Which Workers Must Be Monitored

Medical surveillance requirements are determined by a worker's exposure to lead in the air, by a worker's BLL and, in the construction trades, by work involving certain high exposure "trigger tasks." Jobs and industries that may be associated with lead exposure are listed in Table 4.

The employer must perform personal air sampling if employees are exposed to lead at work. OSHA defines

Table 4
Work Associated with Lead Exposure

General Industry

Lead production or smelting
 Battery manufacturing or recycling
 Brass, bronze, or lead foundries
 Radiator repair
 Scrap metal handling
 Lead soldering
 Firing ranges
 Ceramics manufacturing
 Machining or grinding lead alloys

Construction Industry

Sanding, scraping, burning, or disturbing lead paint
 Demolition of old structures
 Welding or torch cutting lead-painted metal

the Action Level (AL) as an airborne lead concentration of 30 micrograms per cubic meter (ug/m³). The AL triggers certain other requirements of the standards.

Construction workers performing certain tasks are required to have initial BLL and ZPP monitoring when first assigned to jobs such as sanding, abrasive blasting, torch cutting, welding, or demolition where lead is present. All employees exposed at or above the AL for more than 30 days per year must be enrolled in a medical surveillance program provided by the employer.

Air monitoring does not always reflect the actual amount of exposure, particularly when significant exposure occurs through hand-to-mouth activities, such as eating, drinking or smoking in the workplace, that contribute to lead ingestion. Routine BLL and ZPP monitoring of lead-exposed workers provides important additional information to guide prevention efforts.

Blood Lead Levels and Medical Removal

Under the lead standards, all employees who may be exposed to lead above the Action Level must be offered BLL and ZPP tests at specified, minimum time intervals. The required minimum frequency of biological monitoring is summarized in the Schedules for Medical Services (Tables 5 and 6). Construction industry employers must notify their employees in writing of the BLLs within 5 days of receiving the test results. In general industry, written notification is required for BLLs greater than 40 ug/dL. It is recommended that *all* employees be notified of their

Cal/OSHA Lead Standards--Schedule for Required Medical Services

Table 5 GENERAL INDUSTRY (Title 8, California Code of Regulations, §5198)

CATEGORY OF EXPOSURE	MEDICAL EVALUATION	LABORATORY TESTING
Assigned to work with airborne lead exposure at or above 30 $\mu\text{g}/\text{m}^3$ * for more than 30 days per year	Prior to assignment: General and lead-specific history and physical exam with special attention to hematological, neurological (central and peripheral), cardiopulmonary, gastrointestinal, musculoskeletal, renal and reproductive systems. Medical clearance to wear respirator, if used--applies to all categories	<u>Complete lab panel:</u> BLL, ZPP, CBC with red cell indices and peripheral smear, serum creatinine, BUN, complete urinalysis. Sperm analysis or pregnancy test if employee requests. Any other test the physician deems necessary. Repeat BLL and ZPP every six months.
Blood lead level 40 $\mu\text{g}/\text{dL}$ * or greater at last test, but Medical Removal Protection (MRP)** not required	Annually (see above)	Complete lab panel if not done within last 12 months (see above). Repeat BLL and ZPP every two months until two consecutive BLLs are below 40 $\mu\text{g}/\text{dL}$.
Single BLL of 60 $\mu\text{g}/\text{dL}$ or greater, or average BLL 50 $\mu\text{g}/\text{dL}$ or greater based on the last three BLLs or all BLLs over the previous six months (whichever covers a longer time period)--Medical Removal Protection (MRP) required**	As soon as MRP initiated (see above)	Complete lab panel (see above). Repeat BLL and ZPP at least monthly until two consecutive BLLs are at or below 40 $\mu\text{g}/\text{dL}$.
Reports signs/symptoms of lead toxicity, desires advice about effects of lead exposure (on reproductive system, child bearing, etc.), has increased risk of material impairment to health due to lead exposure, or has difficulty breathing with respirator use.	As soon as possible (see above)	As deemed appropriate by the physician based on individual case needs.

Table 6 CONSTRUCTION INDUSTRY (Title 8, California Code of Regulations, §1532.1)

CATEGORY OF EXPOSURE	MEDICAL EVALUATION	LABORATORY TESTING
New employees or those newly assigned to lead work who are performing a specific trigger task*** or who are exposed to airborne lead at or above 30 $\mu\text{g}/\text{m}^3$ * for 1 to 30 days per year and prior BLL, if known, is below 40 $\mu\text{g}/\text{dL}$ *	Medical clearance to wear respirator, if used--applies to all categories	BLL and ZPP
New employees or those newly assigned to work with airborne exposure at or above 30 $\mu\text{g}/\text{m}^3$ * for more than 30 days per year and prior BLL, if known, is below 40 $\mu\text{g}/\text{dL}$	Same as above	BLL and ZPP Repeat every two months for six months, then every six months thereafter.
Blood lead level 40 to 49 $\mu\text{g}/\text{dL}$	Annually: General and lead-specific history and physical exam with special attention to hematological, neurological (central and peripheral), cardiopulmonary, gastrointestinal, musculoskeletal, renal and reproductive systems.	<u>Complete lab panel:</u> BLL, ZPP, CBC with red cell indices and peripheral smear, serum creatinine, BUN, complete urinalysis. Sperm analysis or pregnancy test if employee requests. Any other test the physician deems necessary. Repeat BLL and ZPP every two months until two consecutive BLLs are below 40 $\mu\text{g}/\text{dL}$.
Blood lead level 50 $\mu\text{g}/\text{dL}$ or greater--Medical Removal Protection (MRP) required**	As soon as MRP initiated (see above)	Complete lab panel (see above). Repeat BLL and ZPP at least monthly until two consecutive BLLs are at or below 40 $\mu\text{g}/\text{dL}$.
Reports signs/symptoms of lead toxicity, desires advice about effects of lead exposure (on reproductive system, child bearing, etc.), has increased risk of material impairment to health due to lead exposure, or has difficulty breathing with respirator use.	As soon as possible (see above)	As deemed appropriate by the physician based on individual case needs.

* $\mu\text{g}/\text{dL}$ = micrograms of lead per deciliter of whole blood; $\mu\text{g}/\text{m}^3$ = micrograms of lead per cubic meter of air

** Medical Removal Protection is the required removal of an employee from work with lead exposure, with full salary and benefits, until there are two consecutive BLLs of 40 $\mu\text{g}/\text{dL}$ or below and the physician authorizes return to the usual work.

*** Title 8, California Code of Regulations, Section 1532.1(d)(2)

test results. Notification forms in English, Spanish and Chinese are available from OLPPP.

The physician must recommend to the employer that an employee be removed from lead exposure and enter a **medical removal protection (MRP)** program if any of the following conditions are met:

- **General Industry Standard**

1. A single BLL is 60 ug/dL or greater.
or
2. An average of the last three BLLs or all BLLs over the previous six months (whichever covers a longer time period) is 50 ug/dL or greater.
or
3. The employee has a detected medical condition that places him or her at increased risk from lead exposure.

- **Construction Industry Standard**

1. A single BLL is 50 ug/dL or greater.
or
2. The employee has a detected medical condition that places him or her at increased risk from lead exposure.

A physician can remove an employee with a BLL below the specified MRP levels based on relevant medical findings in individual cases such as pregnancy or symptoms commonly associated with lead toxicity. Whenever an employee is placed on MRP the frequency of biological monitoring must be increased to once a month. After two consecutive BLLs are 40 ug/dL or less, the physician can recommend to the employer that the employee return to the previous work if the employer has taken steps to control lead exposure and the employee's symptoms or any other clinical manifestations of toxicity have resolved. It is recommended these tests be at least one month apart to allow for mobilization and excretion of the lead burden.

During the time an employee is removed from work with lead by a physician's recommendation, the employee must retain earnings, seniority and other benefits. The physician can allow an employee, if physically able, to work in an area free of lead exposure while on MRP. The Cal/OSHA standards permit a worker on MRP to work in any area where the 8-hour time-weighted average (TWA) air lead concentration is less than 30 ug/m³. However, because significant lead exposure can occur even when air lead levels are not elevated (e.g., by hand-to-mouth ingestion), the supervising physician should carefully review the safety of any lead-related work for

an employee on MRP.

The standards require the employer to continue to pay the employee's usual wage and benefits during the removal period, whether or not the employee is working. If workers' compensation disability benefits are used to pay a portion of the salary, the employer is responsible for paying the balance. Upon return to work, the employee is guaranteed his or her former job status.

Medical Evaluations

The lead standards specify frequency and recommended guidelines for medical screening. Annual medical evaluations are required for all employees with a BLL 40 ug/dL or greater in the prior 12 months. In general industry, medical evaluations are required prior to assignment for all employees entering a work area where they may be exposed to lead at or above the Action Level more than 30 days per year. It is the employer's responsibility to ensure that the medical evaluations are performed. Nonetheless, the physician has a major role to play in carrying out the intent of the standards.

The medical evaluation must include all the elements listed in Tables 5 and 6. The physician may include any other medical tests that are deemed necessary based on sound medical practice. As part of a complete respiratory protection program, Cal/OSHA requires medical clearance for any worker using a respirator (Title 8 CCR §5144).

The physician is only permitted to provide the employer with the results of the medical evaluation that relate to the employee's occupational exposure. The employer must forward a copy of the same written information to the employee. The physician should notify the employee directly of any other medical conditions that require further evaluation.

Medical evaluations must be performed as soon as possible if any of the following occur:

- an employee develops signs or symptoms commonly associated with lead toxicity,
- an employee plans to have children and wants medical advice concerning the effects of lead exposure, or
- an employee has difficulty breathing while using a respirator.

Additionally, medical evaluation as appropriate must be provided for an employee who is either removed from exposure to lead due to a risk of sustaining material impairment to health, or who requires special protections as determined by the physician.

Placement of a worker on MRP is considered a reportable illness. A proposed federal OSHA requirement would make a BLL of 40 ug/dL or greater reportable. The physician must file, with the employer's insurer or with the employer if self-insured, a Doctor's First Report of Injury or Illness within 5 days after initial examination for every employee with an occupational injury or illness (Title 8 CCR §14003).

Medical Treatment

The primary therapy for lead poisoning is cessation of exposure. Prophylactic chelation therapy solely to prevent the rise of blood lead levels is a violation of the Cal/OSHA lead standards. Prior to diagnostic or therapeutic chelation therapy, workers must be notified in writing as to why they are receiving this therapy.

In adults, the use of chelation therapy should be reserved for those with *significant symptoms or signs of toxicity* (Table 1). Occasionally adults may have a very high BLL (e.g., 90 ug/dL) and be asymptomatic. These patients should be removed from exposure and followed carefully, but chelation therapy may not prove necessary. Levels above 100 ug/dL are usually associated with significant symptoms that may warrant chelation.

Chelation therapy primarily reduces lead in the blood and soft tissues, such as liver and kidneys, and not in the generally larger fraction of lead in bone. In patients with substantial bone lead stores who are chelated, re-equilibration of lead from bone back into blood and soft tissues may result in a rebound effect with a rise in the BLL after an initial drop. Symptoms associated with lead toxicity may recur.

Chelation guidelines are controversial and may change as new agents and information are introduced. Although chelation has been associated with improvement in symptoms and decreased mortality, controlled clinical trials demonstrating efficacy are lacking, and treatment recommendations have been largely empiric.^{7,26}

Chelation should be considered only on an individual case basis and in consultation with medical providers who are knowledgeable about treatment of adult lead poisoning.²⁷ A list of the University of California Occupational and Environmental Health Clinics is provided in the section titled "For Assistance."

Major differences exist in the recommended treatment of children and adults. For example, the Centers for Disease Control and Prevention recommend chelation for all children with BLLs of 45 ug/dL or greater.

The chelation challenge test, developed in the 1960's to assess total body burden and amount of chelatable lead, has not proven to be a valid predictor of health effects, remote or long-term exposure, or the amount of lead in bone. Chelatable lead reflects little of the total body burden.^{28,29} Currently, there are no data to indicate the chelation challenge test can identify individuals who may derive a therapeutic benefit from chelation. A more promising indicator of bone stores, and thus total body burden, is x-ray fluorescence (XRF) of the bone.³⁰

Approved Labs

Blood lead analyses performed under the lead standards must be conducted by laboratories that meet OSHA accuracy requirements in blood lead proficiency testing. A current list of approved laboratories is available from the regional or area office of federal OSHA (U.S. Department of Labor). For more information, contact the OSHA Salt Lake City Technical Center, Division of Quality Control, Salt Lake City, Utah (801/487-0073) or <http://www.osha-slc.gov/SLTC/bloodlead/index.html>.

Summary

Lead poisoning is preventable. Medical surveillance is a tool to identify excessive lead exposure and to direct and evaluate exposure reduction efforts. The overall goal is to reduce workers' BLLs to that of the general population. The key is exposure reduction through proper engineering controls and work practices. It is worth noting that MRP levels were first established in 1977 when the assumed background BLL for the general population was 19 ug/dL (it is now about 3 ug/dL). Therefore, controlling workplace lead exposure to maintain workers' BLLs below 20 ug/dL should be feasible. Some physicians suggest that medical removal and return trigger BLLs be reduced to 20 and 10 ug/dL respectively.^{31,32} Employers may need to obtain technical assistance in controlling exposures. Cal/OSHA Consultation, OLPPP and some workers' compensation insurers provide such assistance at no cost. By working together, the employer and the clinician can use biomedical information to identify problems and implement improvements in the workplace.

For Assistance

Occupational Lead Poisoning Prevention Program (OLPPP)
California Department of Health Services
1515 Clay St., Suite 1901, Oakland, CA 94612
(510) 622-4332 or 622-4300

University-based Occupational and Environmental Health Clinics
Irvine (949) 824-8641
Los Angeles (310) 794-8144 UCLA
(800) 351-5323 MLK/Drew University
San Diego (619) 294-6206
San Francisco (415) 206-4320 S.F. General Hospital site
(415) 885-7580 Mt. Zion site
Sacramento (800) 582-4003 UC Davis

Cal/OSHA Consultation Service
Free health and safety consultation for employers
Headquarters (800) 963-9424

Cal/OSHA Compliance Regional Offices
Anaheim (714) 939-8611
Los Angeles (818) 901-5730
Sacramento (916) 263-2803
Santa Rosa (707) 576-2419

Childhood Lead Poisoning Prevention Branch (CLPPB)
California Department of Health Services
Oakland, CA (510) 622-5000

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